

REMARKS

I. Introduction

In response to the Final Office Action dated March 25, 2003, claims 1 and 27 have been amended. Claims 1-13 and 27-41 remain in the application. Re-examination and re-consideration of the application, as amended, is requested.

II. Specification Amendment

Applicants' attorney has made amendments to the specification as indicated above. Specifically, a typographical error in the reference numerals identifying the front and back mirrors in the paragraph beginning at page 6, line 19 has been corrected to be consistent with the remainder of the specification. Cf. paragraph beginning at page 9, line 3. No new matter is involved.

III. Claim Amendments

Applicants' attorney has made amendments to the claims as indicated above. These amendments were made solely for the purpose of clarifying the language of the claims, and were not required for patentability or to distinguish the claims over the prior art. Support for these amendments can be found at page 6, line 20 to page 7, line 22 and page 8, line 25 to page 9, line 29 of the application as filed. No new matter is involved.

IV. Non-Art Rejections

On page (2) of the Office Action, claims 1-13 and 27-41 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Applicants have amended independent claims 1 and 27 as indicated above to overcome this rejection.

V. Prior Art Rejections

On page (3) of the Office Action, claims 1-3, 9, 10, 13, and 27-29, 35, 36, 39-41 were rejected under 35 U.S.C. §102(b) as being anticipated by Coldren, U.S. Patent No. 4,896,325 (Coldren).

Applicants first note that the Office Action includes no detailed rejection of claims 4-8, 11, 12, 30-34, 37 and 38 in view of prior art. Accordingly, Applicants believe the Office Action indicates that these claims are allowable if amended to overcome the §112 rejection. Nonetheless, the following arguments with respect to the §102 rejection apply to all the outstanding claims.

Independent claims 1 and 27 are generally directed to a tunable laser and an article of manufacture comprising a waveguide for guiding a light beam including a separate-confinement-heterostructure (SCH) having an energy bandgap that is sufficiently low to provide gain to the light beam, a front mirror defining an end of a cavity in the waveguide and a back mirror defining an opposite end of the cavity in the waveguide. The cavity in the waveguide includes a gain section for creating the light beam and for providing gain for the light beam and a phase section for controlling the light beam around a center frequency of a bandwidth. The front mirror, the back mirror and the phase section are adjusted such that the light beam exits the cavity. Additional gain for the light beam is provided by at least one of the group comprising the phase section, the front mirror and the back mirror in order to partially compensate for losses associated with tuning.

The cited reference does not teach or suggest these various elements of Applicants' independent claims. Particularly, Coldren does not teach or suggest a tunable laser with a waveguide for guiding a light beam including a separate-confinement-heterostructure (SCH) having an energy bandgap that is sufficiently low to provide gain to the light beam. In addition, Coldren does not teach or suggest additional gain for the light beam is provided by at least one of the group comprising the phase section, the front mirror and the back mirror in order to partially compensate for losses associated with tuning.

Coldren merely describes an improvement for allowing selective tuning of the emitted beam over a broad bandwidth to a diode laser having an active section for creating a light beam by spontaneous emission over a bandwidth around some center frequency and for guiding and reflecting the light beam between a pair of mirrors bounding the active on respective ends thereof to create an emitted beam of laser light. The mirrors each have narrow, spaced reflective maxima with the spacing of the reflective maxima of respective ones of the mirrors being different whereby only one the reflective maxima of each of the mirrors can be in correspondence and thereby provide a low loss window at any time. The preferred mirrors each include a plurality of discontinuities to cause the narrow, spaced reflective maxima wherein the spacing of the discontinuities of one mirror

is different from the spacing of the discontinuities of the other mirror so as to cause the wavelength spacing of the maxima to be different.

The Office Action asserts that a waveguide of the present invention is taught by Coldren at col. 6, line 37 to col. 7, line 64, however, Coldren only teaches operation of the mirrors bounding the laser. Moreover, Coldren provides no discussion of a waveguide that provides gain to a light beam anywhere in the specification; the waveguide of Coldren is passive. Furthermore, the Office Action makes no assertion that Coldren teaches a phase and/or mirror section that provides additional gain to compensate for tuning losses as claimed. Thus, because each and every element of the claimed invention is not taught in the cited reference, Applicants respectfully submit that the present §102 rejection is overcome.

Moreover, the various elements of Applicants' claimed invention together provide operational advantages over Coldren. For example, the present invention provides gain in a configuration that has higher saturation power than is found in quantum-well active regions operating in the typical wavelength ranges. In addition, Applicants' invention solves problems not recognized by Coldren. For instance, the present invention recognizes a way to provide gain in an SGDBR mirror and/or phase shift sections to offset the loss that normally accompanies tuning by carrier injection. See page 8, line 25 to page 9, line 2 of the application as filed.

Thus, Applicants submit that independent claims 1 and 27 are allowable over Coldren. Further, dependent claims 2-13 and 28-41 are submitted to be allowable over Coldren in the same manner, because they are dependent on independent claims 1, and 27, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 2-13 and 28-41 recite additional novel elements not shown by Coldren.

VI. Conclusion

In view of the foregoing, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

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Date: 5/27/03

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FAX RECEIVED
MAY 27 2003
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